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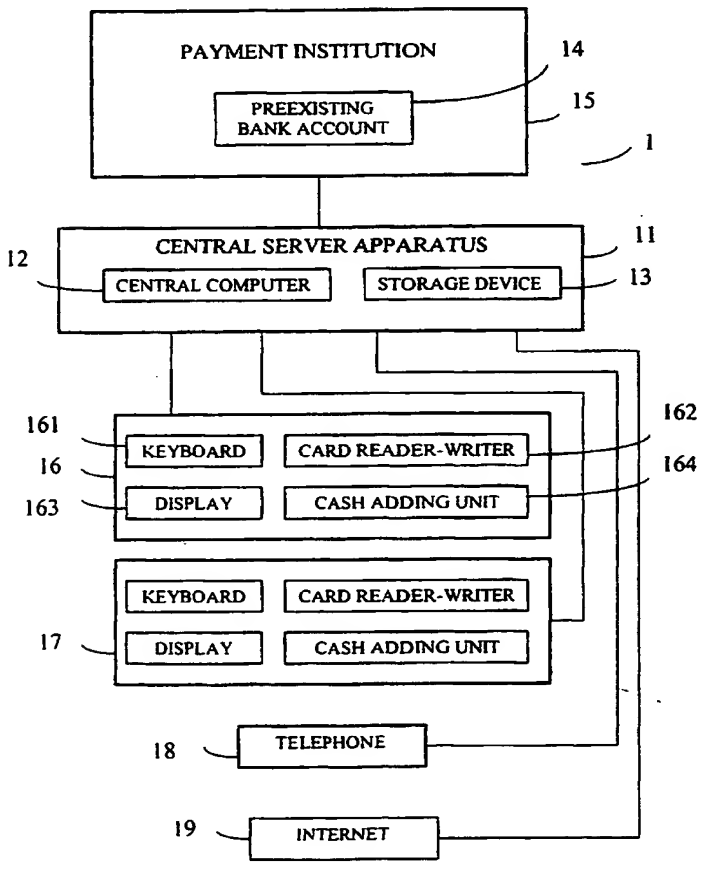

(57) Abstract: Method and system for supervising a usage of smart card by entering a customized policy or updating already loaded policy in the smart card is described. The invention provides a possibility to any authorized user to set and change selectively the card specification in accordance with the policy encrypted in electronic memory of the card. In accordance with the policy instructions, the card allows a cardholder to debit at least one preexisting currency account having a balance with authorized limited currency amount for payments at selected retail establishments, throughout selected territory, in a restricted period of time, and with a predetermined frequency of times when buying a specific set of consumer items and/or receiving a specific set of services.

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SMART CARD WITH CUSTOMIZED POLICY

FIELD OF THE INVENTION

This invention relates to a method and system for use as currency cash substitute when paying vendors for goods and/or services by means of electronically encoded smart cards.

BACKGROUND OF THE INVENTION

Currently, the most popular methods for payment for goods and/or services are credit and debit cards issued by banks or providers such as Visa, MasterCard, American Express, or the like. Credit and debit cards are meant to complement usage of cash and checks, and even be a substitute for them. There are, however, significant differences between these two types of cards.

In particular, credit cards, commonly, are issued by a bank or other financial institution that guarantees to pay expenditures that can be made by the cardholder. Most credit cards give a grace period with several days float and short-term credit at a cheap rate before the money will be deducted from the checking or saving bank account. Debit cards, on the other hand, are usually linked directly to the cardholder's bank account. Thus, when one uses a debit card to pay for a purchase, the money is automatically (and usually instantly) taken out of the bank account. This is a quick transaction between the merchant and the personal bank account without grace period, offered by credit cards.

Regarding debit cards, commonly, two types of the debit cards are in usage. The first type is so called "on-line" debit cards. These cards usually are

enhanced ATM (automated teller machine) cards, which work the same as they would in an ATM transaction. It is an immediate electronic transfer of money from the customer's bank account to the merchant's bank account. In order to access his account at a store terminal, the customer must punch in his personal identification number (PIN). The system checks his account to see if it has enough money available to cover the transaction.

The second type is "off-line" debit cards. These cards usually look like a credit card and resemble a credit card transaction. The merchant's terminal reads the card, identifies it as a debit rather than a credit card, and creates a debit against the corresponding bank account. However, instead of debiting the account immediately, it stores the debit for processing later, usually within several days. Most, but not all, transactions are verified to see if there are adequate funds. Instead, of using a PIN number, the customer must sign a receipt, as he or she would with a credit card.

Credit and debit cards are gaining widespread popularity on business establishment since they offer the consumer many conveniences. For instance, using the cards frees customers from carrying cash or a checkbook, and the cards are even more readily accepted by merchants than checks, wherever the card's brand is accepted. Commonly, customers are not required to provide identification or give out personal information when using a debit card. This makes the transaction quicker and allows you to keep your information to yourself. However, there is a drawback, because the money spent using a debit card comes directly from the bank account, thus the customer may not be protected from fraudulent use of his card or card number.

A method and credit or debit card systems for providing a mechanism for supervising credit or debit card usage is disclosed U.S. Pat. No 5,953710 issued to Fleming. The method and systems allow the available credit to be determined by someone other than the card issuer and that allow a limit to be set on the number of expenditures that can be made. In particular, Fleming proposes a method and system, wherein a separate credit card account for a child is linked

with a parent's credit card account that allows a parent to make changes in available credit for the child's and parent's credit card accounts without requiring bank approval. The parent may allow the child to make purchases unlimited in number, a limited number of purchases, or no purchases, and the parent makes a single payment for both the child's and the parent's credit card accounts.

Despite the advantages, the state-of-the-art credit and debit cards have certain drawbacks. One is their functional non-flexibility due to the small amount of certain information that may be stored in the cards. Typically, the information is stored in a magnetic strip attached to a credit and/or debit card. These information may be, for instance, account identification numbers. Since a memory capacity of this strip is limited, credit and debit cards itself, for example, do not contain an indication of available balance. Thereby, if a card is printed for a specific purpose like a debit card, like a credit card, or like any specialized card (telephone, gas, parking, and so like), the card's specification cannot be changed during the card usage.

An improvement of the drawbacks of the prior art credit and debit card systems may be achieved by utilizing smart cards, that are the latest addition in the world of information technology (see, for example, U.S. Pat. No 4,877,947, U.S. Pat. No 5,521,362, U.S. Pat. No 5,649,118, U.S. Pat. No 5,753,899, U.S. Pat. No 5,811,771, and W.O. Pat. No 9,849,658A1). Despite smart cards are a relatively new technology it already affects the everyday lives of millions of people. They will ultimately influence the way when people shop, see the doctor, use the telephone and enjoy leisure.

Commonly, smart cards are similar in appearance to conventional credit and debit cards, but unlike the ordinary magnetic strip of a credit and/or debit card a smart card contains an integrated chip. The chip stores much more information of various types like electronic data and programs that are protected by advanced security features. Customers can load a smart card with cash value to pay for goods or services (an electronic purse), collect points or receive discounts (a loyalty card). In use, a currency value encoded on the card decreases

each time the card is used, for instance, in vending machines, in the copier or in laundry machines. When the currency amount is used up, additional value can be encoded on the card.

Smart cards have a number of advantages over magnetic stripe cards including greater reliability, higher security mechanisms, storage capacity increased for state-of-the-art smart cards by up to 1000 times and the cards may be multifunctional. The anticipated working life of a smart card is several times longer when compared to a conventional magnetic stripe card.

In view of the above, the aforementioned need in the art for further improvement of the supervising a usage of credit and debit card to make their specification to be more flexible, i.e. be able to change the card policy during its usage. This can be achieved by developing a smart card system instead of usage of conventional credit and debit card systems.

GENERAL DESCRIPTION OF THE INVENTION

The present invention satisfies the aforementioned need by providing a novel method and system for supervising a usage of smart cards. This is achieved by entering a customized policy or updating already loaded policy in a smart card, thereby making the card specification to be more flexible safer and easier for supervising. The invention provides a possibility to any authorized user to set and change selectively the card specification in accordance with the policy encrypted in electronic memory of the card. In accordance with the policy instructions, the card allows a cardholder to debit at least one preexisting currency account having a balance with authorized limited currency amount for payments at selected retail establishments, throughout selected territory, in a restricted period of time, and with a predetermined frequency of times when buying a specific set of consumer items and/or receiving a specific set of services. The policy determining the card specification may be unique to each card, and it allows setting a limit on the manner of the card usage even by someone other than the card issuer.

According to one embodiment of the invention, the preexisting account provided by any payment institution, and it may be any credit card, any debit card or other account that is provided, for example, by Visa, MasterCard, American Express, unemployment compensation, or the like. In these situations, the card itself may not contain an account indicating available credit and the amount of purchase from the vendor may be directly withdrawn from one of the preexisting accounts provided by the authorized user, within the policy restrictions, by correspondingly reducing the available therein currency.

According to another embodiment of the invention, the preexisting account is prepaid in advance electronic currency that is stored in the card memory and that was installed within the limitations of the policy. In this case, in operation, the currency amount of a purchase might be withdrawn from the account of the electronic card itself by correspondingly reducing the available currency stored in the card memory.

According to yet another embodiment of the invention, the preexisting account may include a combination of both sources, and may be an account provided by a payment institution together with prepaid in advance electronic currency.

According to this invention, the system for entering or updating a policy in a smart card includes a central server apparatus of the card provider having a storage device and configured to be in access with a preexisting bank account of an authorized user. The system further includes a specially designed one or more terminals for entering or changing earlier encrypted policy in the smart card. Each of the specially designed terminals, which may be remote or close disposed, includes a policy introduction keyboard, a card reader-writer unit and should be configured to access central server apparatus and a display for displaying policy statement entries. For example, a displayed text can tell the user how much money is being deducted and how much is left on the card's balance. In accordance with the invention, the instructions from the authorized user for reloading a new policy in the card also might be sent to the terminal via

conventional telephone, cellular phone, Internet, or any other computer network, i.e. without using the policy introduction keyboard of the specially designed terminals.

The terminal may further include a cash value adding unit in case the card is designed to have prepaid electronic currency stored in the card's memory, and authorized user chooses this way to replenish the card balance. The cash adding unit should provide a possibility to transfer a value onto the card equivalent to the amount of cash inserted into the unit.

According to the invention, the user may replenish the card balance via Internet or even at any point of sale equipped with a card reader/writer unit via online transaction. In this case the money may be downloaded into the card's memory from the user's bank account.

According to the invention, the system should be configured in order to provide the user with an opportunity to download the predetermined by the policy balance of money into the card either when the entire amount will be expired or earlier, after usage a part of the balance. In the later case, the deducted amounts will be replenished immediately, during every on-line debit or credit transaction, within the same connection.

According to the invention, organization of the policy imposed on the card usage may have several levels. For example, on the first level, a policy may be set in the central server apparatus by the service provider. This first level policy is aimed to meet the tax regulations of the Internal Revenue Service or any other equivalent organization of each particular country. On the next level, a policy may be business oriented. This policy nested within the policy established on the first level and may be set already by an authorized user. This will insure that any transactions made by using the card would be tax deductible and business oriented. By the same token, a cardholder, which received the card from the authorized user, may set his own policy that will be nested within the policies of the authorized user and the card provider.

According to the invention, the smart card, depending on the customized

policy, may also be a multifunctional card, which includes a memory unit for storing the encrypted policy and a processor chip programmed, according to this policy. The policy may combine the electronic purse function with a function of other applications related to registration of data and information. With these other applications, the cardholder, for instance, may use the card as a public transport ticket, and/or for access to buildings and rooms. Potential uses might include vending machines, residence laundry, and parking meters.

Accordingly, there are no restrictions on the appearance of the card and the types of functions other than the payment options. As it may be clear to those skilled in the art, the card may additionally be equipped with a keypad and display and be integrated together with a digital calculator. Further, the electronic chips of the card may be additionally programmed in order to provide various functions, for example, the card may provide a calendar, and/or transformer of the current values of one currency into a value of any other currency, and many others functions. Further, the card may be equipped with a beeper for giving a signal when needed, i.e. if any violation of the card usage is registered.

According to the invention, the smart card may additionally be equipped with a magnetic strip in order to perform all the functions of the state-of-the-art credit and debit cards in the framework of the encoded policy. When the card is equipped with in a magnetic strip, verification of various validations imposed by the policy will by carried out, for example, via connection to the central server apparatus. Hence, this card will combine the functions of conventional credit and debit cards with all the functions described in the current invention. Such a card may be associated with more than one accounts that will be available, respectively, through the magnetic strip and the connection means (via electrical contacts or contactless) as described above.

According to the preferred embodiment of the invention, the authorized user is an account owner himself, or the cardholder is any person entitled to use the card after receiving authorization from the authorized user.

According to another preferred embodiment of the invention, the

authorized user and the cardholder are a parent and his child, respectively.

According to yet another preferred embodiment of the invention, the authorized user is employer, who wants to supervise a usage of the card in purchase only work-related items by his employee, who is the cardholder.

According to the invention, if the card is stolen or lost the authorized user or the cardholder can change the policy by locking the card with a special code to prevent its misuse. When locked, transfers from the card are not allowed and statement entries cannot be displayed allowing the owner to keep his currency secure.

As will become clear to those skilled in the art, the method and system for supervising a smart card of the invention differs from other previously described methods without the use of policy encrypted in the card. The advantages of this technology are far-reaching. Customers will benefit by use of the technology of this invention since it increases the quality of their life. For instance, a smart card with the policy, which allows cardholder to use only limited currency amount, cannot be used beyond its balance. Hence, children will be able to use it without worrying about building-up debts on their parent's bank account. The use of a smart card with customized policy may not involve the documentation work associated with conventional credit cards since no signature is required when the maximum sum deducted is relatively small. When this amount is large and exceeds the threshold determined by the policy, the use of PIN code or biometrics may be involved, that means that a person can be reliably identified by his/her hand, fingerprints, retina of the eye, and/or sound of the voice. The PIN code and biometrics data may be stored in the card's memory, and the identification may not demand a retrieving such information from the central server apparatus of the card provider. As will be clear to those skilled in the art, that authorization for the use of electronic information stored in the smart card may be even performed by using a spoken word or the touch of a hand.

According to the invention, an authorized user or cardholder may receive at any time information stored in the card about the financial transactions made

by using the card. For instance, the users can retrieve the information about the number of invoices and/or numbers accounts wherever the transactions were performed.

The significance of the technique and applications of the invention goes beyond the preparation of a means for a payment for goods and/or services. Smart cards with a customized policy encrypted therein may be programmed for many customers specifications and may be installed, for instance, into the following environments: Education (Schools, Colleges, Universities); Hospitality (Pubs, Restaurants, Hotels); Clubs (Golf clubs, Health clubs, Night Clubs); Retail (Pet shops, Salons, Boutiques); Public Sector (Catering, Libraries) and so like. According to the invention, the policy and thereby the loaded specification can be easily changed as soon as the card owner will decide to do that.

According to the invention, the system should be configured in order to provide the user with an opportunity to receive a report, depending on his choice, about all or at least a part of the transactions conducted within a predetermined period of time. The account owner may insert a policy that some of the information will not be presented in his monthly report.

The present invention thus provides a method for supervising a usage of a smart card for payments for goods or services by debiting at least one preexisting currency account having a balance with an available currency amount, the method including the step of setting a specification of said smart card by entering into electronic memory of the card a policy that provides a possibility to any authorized user selectively to set and change limits on the card's usage; said limits are at least one member from the group including: (i) a limit on the available currency amount to a predetermined maximum amount; (ii) a limit on the currency value that is allowed to spent for each specific item; (iii) an appropriate time period during which the payment can be executed; (iv) a selected territory where the payment can be executed; (v) selected retail establishments wherein the payment can be executed; (vi) a frequency of times when the payment can be executed; (vii) a specific set of items for receiving which the payment can be

executed; (viii) a specific set of services for receiving which the payment can be executed.

This invention also provides a system for supervising a usage of a smart card by entering a policy into the card that provides a possibility to any authorized user selectively to set or change a card specification for payments for goods or services by debiting at least one preexisting currency account having a balance with an available currency amount, the system comprising:

(i) a preexisting bank account of the authorized user;

(ii) a central server apparatus of the card provider configured to be in access with a preexisting bank account of an authorized user, said central server apparatus having:

(a) a central computer;

(b) a storage device coupled with said central computer;

(i) an at least one terminal coupled with said central server apparatus comprising:

(a) a policy introduction keyboard for entering instructions from the authorized user for setting and reloading the policy in the card, said policy being at least one member from the group including: (i) a limit on the available currency amount to a predetermined maximum amount; (ii) a limit on the currency value that is allowed to spent for each specific item; (iii) an appropriate time period during which the payment can be executed; (iv) a selected territory where the payment can be executed; (v) selected retail establishments wherein the payment can be executed; (vi) a frequency of times when the payment can be executed; (vii) a specific set of items for receiving which the payment can be executed; (viii) a specific set of services for receiving which the payment can be executed;

(b) a card reader-writer device for entering the policy; and

(c) a display for monitoring policy statement entries, card's history and statistics.

The present invention further provides for use in the system of the kind specified above a preexisting bank account of the authorized user.

The present invention still further provides for use in the system of the kind specified above a central server apparatus of the card provider configured to be in access with a preexisting bank account of an authorized user, said central server apparatus having:

(a) a central computer;

(b) a storage device coupled with said central computer.

The present invention further provides for use in the system of the kind specified above a at least one terminal coupled with said central server apparatus comprising:

(a) a policy introduction keyboard for entering instructions from the authorized user for setting and reloading the policy in the card;

(b) a card reader-writer device for entering the policy; and

(c) a display for monitoring policy statement entries, card's history and statistics.

The present invention yet further provides for use in the system of the kind specified above a smart card storing data indicative of a policy that provides a possibility to any authorized user selectively to set and change limits on the card's usage, said limits are at least one member from the group including: (i) a limit on the available currency amount to a predetermined maximum amount; (ii) a limit on the currency value that is allowed to spent for each specific item; (iii) an appropriate time period during which the payment can be executed; (iv) a selected territory where the payment can be executed; (v) selected retail establishments wherein the payment can be executed; (vi) a frequency of times when the payment can be executed; (vii) a specific set of items for receiving which the payment can be executed; (viii) a specific set of services for receiving which the payment can be executed.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to understand the invention and to see how it may be carried out in practice, a preferred embodiment will now be described, by way of non-limiting example only, with reference to the accompanying drawings, in which:

Fig. 1 is a schematic diagram illustrating the system for entering or updating a policy in a smart card in accordance with the invention;

Fig. 2 is a flowchart of the logic to be applied in an interaction of a cardholder and a vendor reader device according to the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Reference will now be made in detail to the detailed description of the invention in conjunction with the preferred embodiments thereof. It should be understood that the described embodiments are not intended to limit the invention specifically to those embodiments. On the contrary, the invention is intended to cover alternatives, modifications and equivalents, which may be included within the spirit and scope of the invention as defined by the appended claims.

Referring first to Fig. 1 the system 1 for entering or updating a policy in a smart card (not separately depicted in the figure) of the present invention includes a central server apparatus 11 of the card provider having a central computer 12, a storage device 13 and configured to be in access with a preexisting bank account 14 of an authorized user. The preexisting bank account may be provided by a payment institution 15 and may be in a form of any credit card, any debit card or other account that is provided, for example, by Visa, MasterCard, American Express, unemployment compensation, or the like.

The system further includes at least one local terminal 16 placed in the vicinity to the main server and one or more remote disposed terminals 17. The terminals 16 and 17 should be configured to access central server apparatus 11, and are designed for entering a new policy or changing encrypted earlier policy in

a smart card carrying a chip for policy encrypting.

Each of the terminals includes a policy introduction keyboard 161, a card reader-writer device 162. Each terminal further may include a display 163 for monitoring policy statement entries, card's history and statistics. For example, a displayed text can tell the user how much money is being deducted and how much is left on the balance of the card. In accordance with the invention, the instructions from the authorized user for reloading a new policy in the central server apparatus might be sent to the terminal via regular or cellular telephone 18, Internet 19 or any other communication way, i.e. without using the policy introduction keyboard 161 of the local or remote disposed terminals.

The terminals may further include a cash value adding unit 164 in case when the card is designed to have prepaid electronic currency stored in the card memory, and authorized user chooses this unit to replenish the card balance. The cash adding unit that should provide a possibility to transfer a value onto the card equivalent to the amount of cash inserted into the unit.

According to the invention, the user may replenish the card balance via Internet or other computerized network. In this case the money may be downloaded into the card's memory from the user's bank account. For example, the user may set in the policy, that this replenishment will be automatic within every online transaction.

In a method of use, an authorized user approaches to a card provider for issuing and obtaining at least one blank smart card. An authorized user may be any account holder having at least one account that is provided by any payment institution, for example, by a bank, Visa, MasterCard, American Express, unemployment compensation, or the like. The blank card then can be sent to any user of the card. For example, the card may be given to a child or a mentally infirm elderly person, or any other person who is needed supervision of expenditures.

The blank card obtained from a provider may further be loaded with a customized policy that is contemplated in advance. In accordance with the policy

instructions, the card allows a cardholder to debit at least one given currency account having a balance with authorized currency amount.

According to one preferred embodiment of the invention, the given account is a preexisting bank account provided by any payment institutions. In these situations, the card itself may not contain an account indicating available credit. In this case the amount of purchase from a vendor may be directly withdrawn from one of the preexisting accounts provided by the authorized user, within the policy restrictions, by correspondingly reducing the available therein currency.

According to another preferred embodiment of the invention, the given account is prepaid electronic currency that is stored in the card memory and that was installed within the limitations of the policy. In operation, the currency amount of a purchase may be withdrawn from the electronic card itself by correspondingly reducing the available currency stored in the card memory.

The source for further replenishment of the electronic currency installed in the account of the card is predetermined by the policy and may take any suitable form such as a currency value added unit 164, and/or a preexisting bank account provided by the payment institution 14.

The policy encrypted in the card should allow the user to set a margin on the manner of the card usage. For example, the policy data are stored in the card's memory and might preferably determine a maximal currency amount that can be spent for payments at selected retail establishments throughout the selected territory. Further it also may determine a restricted period of time of the card's availability for buying a specific set of consumer items and/or receiving a specific set of services. The policy, additionally, may determine a predetermined frequency of times when the purchase of each specific item is allowed.

Accordingly, as soon as the policy is contemplated it may be introduced into the storage device 13 of the central server apparatus 11. The introduction can be performed by using the local terminals 16, remote disposed terminals 17, or via usage the telephone 18 or Internet 19. In this case downloading the policy and

encrypting it in the card may be done later by the cardholder as soon as he will approach to the card reader-writer device 162 at any point of sale.

As it can be clear to a versed man, the current invention introduction instructions of the customized policy from the authorized user to a smart card is not bound to these particular terminal devices and other communication ways may be used. For example, a card reader-writer unit may be installed in a cellular phone of a cardholder. Thus the cellular phone that may work as the remote disposed terminal 17. In this case, a customized policy can be downloaded in a memory module of the cellular phone wherein it can be stored in a protected form. Further, the cardholder, if desired, may insert a smart card in the card reader-writer unit of the cellular phone for entering and encrypting the policy in the card in the manner as described above.

In a method of use, the central server apparatus 11 receives a call from an authorized user requesting an authorization code for introducing a policy, and in response thereto, verifies funds in a preexisting customer account and provides an active authorization code allowing introduction of the policy and its storage in the storage device 13. Only the authorized user, providing an authorization code in the form of a PIN code or any other method of identification, is able to change the policy. For example, a use of Biometrics may be involved in the authorization, that means that a person can be reliably identified by his/her hand, fingerprints, retina of the eye, and/or sound of the voice. As will be clear to those skilled in the art, that for the authorization, the use of electronic information in smart cards may be even performed by using a spoken word or the touch of a hand.

As long as the policy information is stored in the storage device 13, it can easily be transformed at any time into the electronic memory of a smart card to be stored there in the encrypted form.

The smart card includes a housing, a means that provide a communication between the card and a reader-writer device of the terminal, a memory, and a processor operatively joined to the memory. In a method of use, in order to

download the policy from the storage device to the card the cardholder should establish an operative connection between the reader-writer device 162 of the terminal and the card through a connection via electrical contacts or in a contactless manner, and provide the corresponding transaction command. Such connection can, for example, be via electrical connectors on the reader-writer 162 and the card. The connectors provide transfer data to and from the card's chip. Thus for establishing the contact connection, the card should be inserted into the reader-writer device 162 that makes direct electrical contact. In case of contactless connection, the reader-writer device 162 and the smart card should be equipped with contactless means that provide a transaction when the card, with an electronic microchip and an antenna embedded inside, be passed near an antenna of the contactless reader-writer.

According to the invention, the authorized user can always modify and update the policy that is already stored in the storage device 13. The modified policy is reloaded in the smart card in order to update the policy stored therein by the same manner as described above. This policy remains fixed in the card until the authorized user chooses to change or update it, or until the policy expires its validly. The expiration date is a part of the policy and the authorized user may set the expiration for each part of the policy on his choice.

As it also may be clear to those skilled in the art, the card may additionally be equipped with a card keypad, a card display and a source of energy (a battery or a photoelectric cell). Accordingly, such a card, for instance, may allow a tourist to transform a typed amount of money from one currency to another currency of his interest. Such a card also allows any cardholder to lock and reactivate the card by typing a personal code onto the card itself. This, for example, will enable users to leave their cards in wallets unguarded without the threat of misuse by others.

As it will be clear to a versed man, the smart card may additionally be equipped with a magnetic strip in order to perform all the functions of the state-of-the-art credit and debit cards in the framework of the encoded policy.

Hence, this card will combine the functions of conventional credit and debit cards with all the functions described in the current invention. Such a card may be associated with more than one accounts that will be available, respectively, through the magnetic strip and the connection means (via electrical contacts or contactless) as described above.

The method of usage the card in accordance with the present invention may be best understood by referring to Fig 2. Accordingly, a cardholder 21 presents the card (not separately depicted in the figure) as a cash substitute at a retail outlet 22 that may be a vendor machine or establishment 221 for retail of drinks, snacks, fast food, etc. By the same token, the cardholder may present the card at a service provider 222, such as, telephone, car wash, or the like. Each recipient entity (221 and/or 222) has a card reader 2211, which is integrated with a processing device 2212 and a transaction device 2213.

The processing device processes the smart card according to the policy encrypted therein, whereby data stored in the smart card are altered to represent a registration of performing of a financial operation or providing of a service. The registration is needed for preventing overuse the card over the policy regulations.

The processing of the smart card includes a sequence of physical operations related to verification of various validations imposed by the policy that prevent the smart card usage by an unauthorized person, who has found or stolen the card.

The verification of various validations may include, for example, a user validation check 23 that may be done by state-of-the-art methods through the use of a PIN secret code and/or biometrics. For example, if the cardholder is a child, then his fingerprint encrypted in the card may be use for his identification.

Accordingly, the money could only be deducted from the account associated with the card if the entered PIN code or the biometrics match those prescribed by the policy. If the cardholder made a mistake, a new attempt of the verification may be allowed. A number of fallacious attempts to enter the code is counted by a counter 24, this number is limited. If this number exceed a number

that is predetermined by the encrypted policy, then the smart card will be "locked" 28 or retained by the terminal and will not be available for the further use. If so, the authorized user will be notified, and he will be to reactivate the card at will.

Sometimes, the policy may be set to allow a payment only for selected items, or for items of relatively small amounts of money without a secret code. In this case the maximum sum of the deductible relatively small amounts of money may be defined by the policy. Hence, an unauthorized user who does not know the secret number can thus use only this maximum sum of money so that the damage is limited.

The verification further may include a card balance check 25, that may follow the user validation check, and is intended for retrieving the available credit for the cards that have been set by the policy.

The further validation checks 26 prescribed by the policy might, for instance, include an item validation check (not depicted in the figure) that provide a possibility to buy only specific items throughout the selected retail establishments on predetermined territory, while excluding other items from consideration. Thus a parent providing a child with such a card allows the child to buy only a specific most essential set of items at selected stores and exclude certain luxury items or adult materials. Hence, the child does not have the freedom to squander money on needles, frivolous, or harmful items.

As it might be clear to a versed man, the further validation checks 26 prescribed by the policy might include a verification of a period of time eligible for shopping, a predetermined frequency of times when purchasing of specific items is permitted and many others, depending on the card functionality. The locking operation described above can be applied in accordance with the policy to any verification step for preventing a misuse of the card. Since only the authorized user and cardholder knows the details of the particular policy, an unauthorized person who found or stolen the card will not know, for instance, where to buy and what items are allowed for the purchase. It means that the

locking operation will quickly deactivate the card after one or several fallacious attempts, as it was defined in the policy.

According to the invention, when the card is equipped with in a magnetic strip, verification of various validations imposed by the policy will by carried out, for example, via connection to the central server apparatus.

According to the invention, after passing the verification steps a further step is monetary (or its equivalent) transactions 27 from the given account indicating available card credit to the corresponding means of the card reader of the recipient entity. The transactions may be executed by conventional methods either from a preexisting bank account and/or from the prepaid electronic currency stored in the card.

Those having skill in the art may understand that there are no restrictions on the appearance of the card. The size and shape of the card, for example, may be determined by an international standard (ISO 7810). This standard also may define the physical characteristics of the plastic, such as temperature tolerance and flexibility. It also defines a position of the electrical contacts and their functions, if the means that provide a communication between the card and a card-reader-writer is via the contacts, and how the integrated circuit communicates with the outside world. Several types of plastic may be used for the smart cards of the present invention, for example, such as PVC (Polyvinyl Chloride) that can be embossed but is not recyclable, or ABS (Acrylonitrile Butadiene Styrene) that cannot be embossed but is recyclable.

Since the main components of the smart card, such as a card processor chip, a card memory unit, and a source of electric energy may be miniaturized, then the card may be integrated with any utensil carried by a cardholder, for example, with a watch, spectacles, jewelry, etc.

While the present invention has been described in terms of several preferred embodiments, those having skill in the art to which the present invention pertains can now perceive various modifications, improvements and additions, which may be made by the invention. Accordingly, when a user utilizes

the smart card for payments of small amounts of money, for example, one dollar or less, and the payment institution is unwilling to perform small amount transactions, the user can introduce a policy in the card to debit the preexisting currency account in batches. In this case the debit amounts will be stored and accumulated in the card's memory, and in the central server apparatus, and only when amount of money will reach a predetermined value, or when a predetermined period of time expires, the financial transaction will be performed for the entire batch.

Further, the smart card may be a multifunctional card. The policy may combine the electronic purse function with a function of for other applications, relating to the registration of data and information. With these other applications, the cardholder, for instance, may use it as a public transport ticket, and for access to buildings and rooms. Potential uses include vending machines, residence laundry, parking meters, etc. There are no restrictions on the types of functions other than the payment options. Accordingly, as it may be clear to those skilled in the art, the card may additionally be integrated together with a digital computer. Further, the electronic chips of the card may be additionally programmed in order provide various functions, for example, the card may provide a calendar, and/or transformer of the current rates of various currencies and many others functions.

It will also be understood that the system according to the invention should be suitably programmed. Likewise, the invention contemplates software being readable by the central computer for executing the method of the invention. The invention further contemplates a machine-readable memory tangibly embodying a program of instructions executable by the machine for executing the method of the invention.

The scope of the invention is not to be construed as limited by the illustrative embodiments set forth herein, but is to be determined in accordance with the appended claims.

CLAIMS:

1. A method for supervising a usage of a smart card for payments for goods or services by debiting at least one preexisting currency account having a balance with an available currency amount, the method including the step of setting a specification of said smart card by entering into electronic memory of the card a policy that provides a possibility to any authorized user selectively to set and change limits on the card's usage, said limits are at least one member from the group including: (i) a limit on the available currency amount to a predetermined maximum amount; (ii) a limit on the currency value that is allowed to spent for each specific item; (iii) an appropriate time period during which the payment can be executed; (iv) a selected territory where the payment can be executed; (v) selected retail establishments wherein the payment can be executed; (vi) a frequency of times when the payment can be executed; (vii) a specific set of items for receiving which the payment can be executed; (viii) a specific set of services for receiving which the payment can be executed.

2. The method of claim 1 further comprising the step of locking the smart card for deactivating said card when a number of attempts violating said limits of the card usage exceeds a predetermined number.

3. The method of claim 2 further comprising the step of reactivating the smart card.

4. A system for supervising a usage of a smart card by entering a policy into the card that provides a possibility to any authorized user selectively to set or change a card specification for payments for goods or services by debiting at least one preexisting currency account having a balance with an available currency amount, the system comprising:

(i) a preexisting bank account of the authorized user;

(ii) a central server apparatus of the card provider configured to be in access with a preexisting bank account of an authorized user, said central server apparatus having:

(a) a central computer;

(b) a storage device coupled with said central computer;

(iii) an at least one terminal coupled with said central server apparatus comprising:

(a) a policy introduction keyboard for entering instructions from the authorized user for setting and reloading the policy in the card, said policy being at least one member from the group including: (i) a limit on the available currency amount to a predetermined maximum amount; (ii) a limit on the currency value that is allowed to spent for each specific item; (iii) an appropriate time period during which the payment can be executed; (iv) a selected territory where the payment can be executed; (v) selected retail establishments wherein the payment can be executed; (vi) a frequency of times when the payment can be executed; (vii) a specific set of items for receiving which the payment can be executed; (viii) a specific set of services for receiving which the payment can be executed;

(b) a card reader-writer device for entering the policy; and

(c) a display for monitoring policy statement entries, card's history and statistics.

5. The system of claim 4 wherein the preexisting bank account is provided by a payment institution selected from the group consisting of a credit card, a debit card, an account provided by Visa, an account provided by MasterCard, an account provided by American Express, and an account provided by unemployment compensation.

6. The system of claim 4 further comprising a connection via a telephone or cellular phone for introduction the policy into said storage device.

7. The system of claim 4 further comprising an Internet connection for introduction the policy into said storage device.

8. The system of claim 4 wherein said terminal further comprising a currency value added unit for storing a prepaid electronic currency in the card.

9. The system of any one of the preceding claims wherein the smart card comprising:

(i) a card processor chip programmed according to the policy;

(ii) a card memory unit coupled with a card processor for storing the entered policy;

(iii) a means coupled with said card processor chip for providing an operative connection between the card and said a card reader-writer device;

(iv) a source of energy coupled with said card processor chip and card memory unit.

10. The system of any one of the preceding claims wherein the smart card further comprising:

(i) a card keypad coupled with said card processor chip for typing a personal information data onto the card;

(ii) a card display coupled with said card processor chip for monitoring the personal information entered in the card.

11. The system of claim 10 wherein the personal information data are personal codes for locking and reactivating the card.

12. The system of claim 10 wherein said smart card is integrated with a computer for transforming a value of one predetermined currency into a value of another predetermined currency.

13. For use in the system according anyone of claims 4 to 12, a preexisting bank account of the authorized user.

14. For use in the system according anyone of claims 4 to 12, a central server apparatus of the card provider configured to be in access with a preexisting bank account of an authorized user, said central server apparatus having:

(a) a central computer;

(b) a storage device coupled with said central computer.

15. For use in the system according anyone of claims 4 to 12, an at least one terminal coupled with said central server apparatus comprising:

(a) a policy introduction keyboard for entering instructions from the authorized user for setting and reloading the policy in the card;

(b) a card reader-writer device for entering the policy; and

(c) a display for monitoring policy statement entries, card's history and statistics.

16. For use in the system according anyone of claims 4 to 12, smart card storing data indicative of a policy that provides a possibility to any authorized user selectively to set and change limits on the card's usage, said limits are at least one member from the group including: (i) a limit on the available currency amount to a predetermined maximum amount; (ii) a limit on the currency value that is allowed to spent for each specific item; (iii) an appropriate time period during which the payment can be executed; (iv) a selected territory where the payment can be executed; (v) selected retail establishments wherein the payment can be executed;

(vi) a frequency of times when the payment can be executed; (vii) a specific set of items for receiving which the payment can be executed; (viii) a specific set of services for receiving which the payment can be executed.

17. A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps for supervising a usage of a smart card for payments for goods or services by debiting at least one preexisting currency account having a balance with an available currency amount, the method including the step of setting a specification of said smart card by entering into electronic memory of the card a policy that provides a possibility to any authorized user selectively to set and change limits on the card's usage, said limits are at least one member from the group including: (i) a limit on the available currency amount to a predetermined maximum amount; (ii) a limit on the currency value that is allowed to spent for each specific item; (iii) an appropriate time period during which the payment can be executed; (iv) a selected territory where the payment can be executed; (v) selected retail establishments wherein the payment can be executed; (vi) a frequency of times when the payment can be executed; (vii) a specific set of items for receiving which the payment can be executed; (viii) a specific set of services for receiving which the payment can be executed.

18. A computer program product comprising a computer useable medium having computer readable program code embodied therein for supervising a usage of a smart card for payments for goods or services by debiting at least one preexisting currency account having a balance with an available currency amount, said computer readable program code for causing the computer to set a specification of said smart card by entering into electronic memory of the card a policy that provides a possibility to any authorized user selectively to set and change limits on the card's usage, said limits are at least one member from the group including: (i) a limit on the available currency amount to a predetermined

maximum amount; (ii) a limit on the currency value that is allowed to spent for each specific item; (iii) an appropriate time period during which the payment can be executed; (iv) a selected territory where the payment can be executed; (v) selected retail establishments wherein the payment can be executed; (vi) a frequency of times when the payment can be executed; (vii) a specific set of items for receiving which the payment can be executed; (viii) a specific set of services for receiving which the payment can be executed.

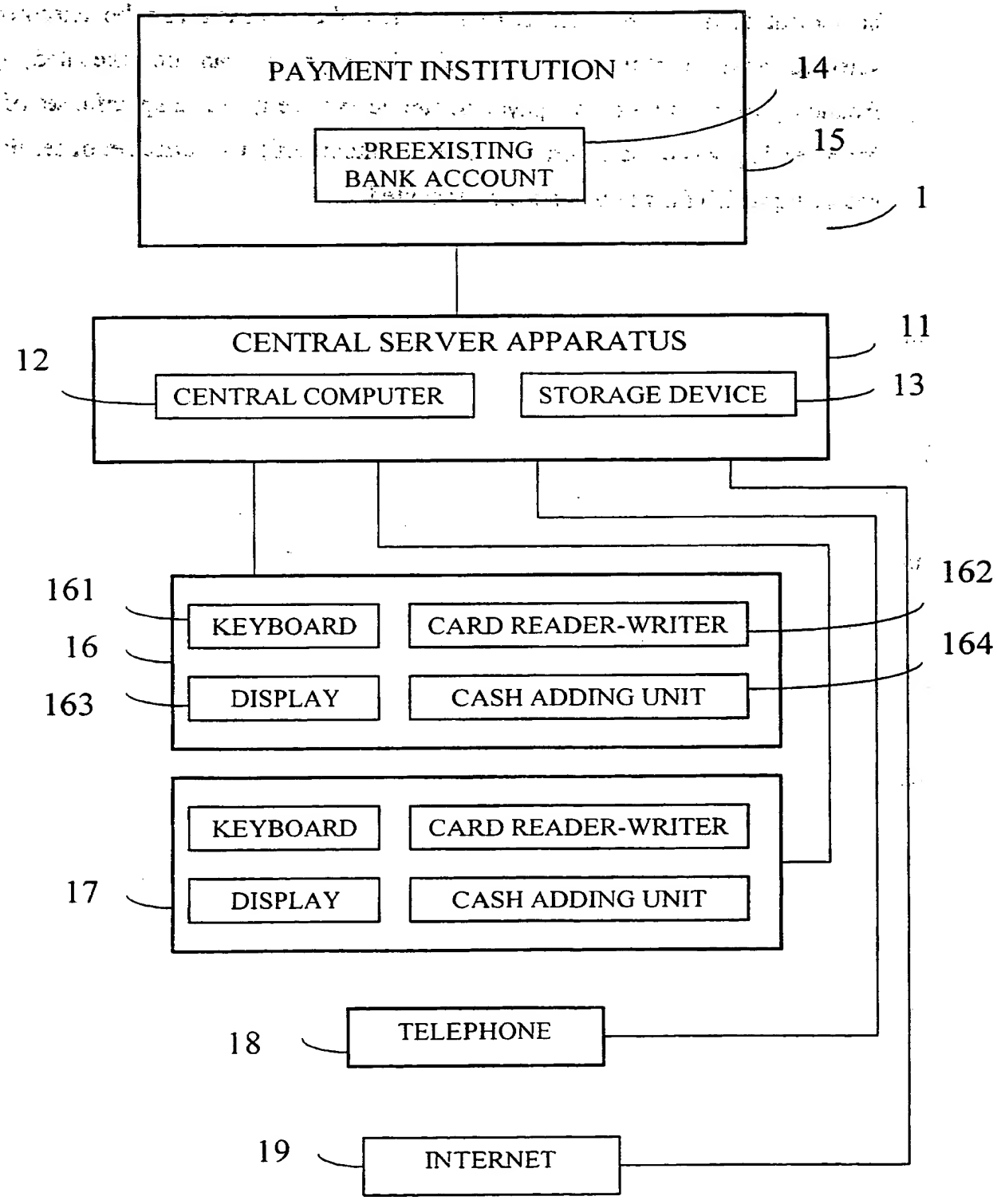
PAYMENT INSTITUTION
14
PREEXISTING BANK ACCOUNT
15
1
CENTRAL SERVER APPARATUS
11
12
CENTRAL COMPUTER
STORAGE DEVICE
13
161
162
KEYBOARD
CARD READER-WRITER
16
164
DISPLAY
CASH ADDING UNIT
163
KEYBOARD
CARD READER-WRITER
17
DISPLAY
CASH ADDING UNIT
18
TELEPHONE
19
INTERNET

FIG. 1

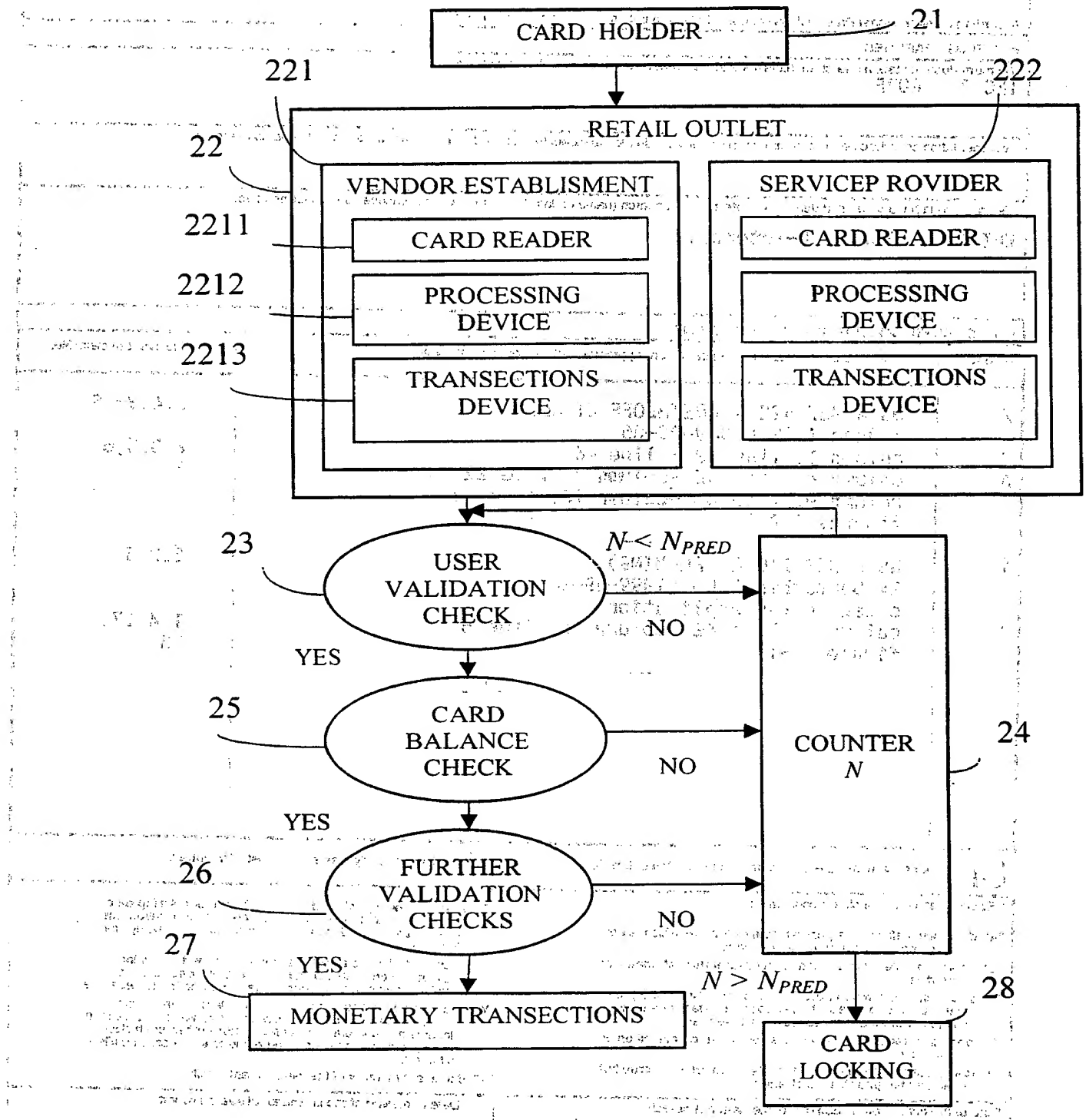
CARD HOLDER
21
221
222
RETAIL OUTLET
22
VENDOR ESTABLISMENT
SERVICEP ROVIDER
2211
CARD READER
CARD READER
2212
PROCESSING DEVICE
PROCESSING DEVICE
2213
TRANSECTIONS DEVICE
TRANSECTIONS DEVICE
23
USER VALIDATION CHECK
N < N_PRED
NO
YES
25
CARD BALANCE CHECK
NO
COUNTER N
24
YES
26
FURTHER VALIDATION CHECKS
NO
27
YES
N > N_PRED
28
MONETARY TRANSECTIONS
CARD LOCKING

FIG. 2

INTERNATIONAL SEARCH REPORT

Inten nal Application No
PCT/IL 00/00653

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G07F7/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G07F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
WPI Data, PAJ, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 837 422 A (DETHLOFF ET AL.) 6 June 1989 (1989-06-06)	1,4,8-18
Y	column 1, line 12 - line 46	2,3,5,6
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[X] Further documents are listed in the continuation of box C. [X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 February 2001	22/02/2001

Name and mailing address of the ISA	Authorized officer
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INTERNATIONAL SEARCH REPORT

International Application No
PCT/IL 00/00653

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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